micro math magic

Teacher's Manual

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How to Use This Manual

The *Micro Math Magic Teacher's Manual* is designed to be of help to both a beginning user and an experienced user of microcomputers. The Micro Math Magic programs are to be used with Apple* II, Apple II Plus, and Apple IIe microcomputers, 32K or larger, DOS 3.3, with Applesoft*. When using an Apple IIe, be sure the Caps Lock key is down.

The Copyright Data page provides information regarding copyright.

Chapter I (Educational Benefits from, Advantages of, and Application of Using the Micro Math Magic Program) describes the application of the programs as determined through three years of field testing.

Chapter II (Content of Disks) describes exactly what is on each disk. This includes the disk number and title, the numbers and names of the programs on the disk, a statement about what the program is designed to teach, and a description of some of the programs on the disk.

Chapter III (Using the Disks) is designed to provide the user with an understanding of how the system is organized. It is designed to relate in particular to the teacher who is just beginning the microcomputer experience. This chapter has three parts. The first part is about using the program without the management system. Another is about using the program with the management system. The last part is about working with the management system.

Constant use of the "Menu" format throughout the Micro Math Magic programs makes it very easy for youngsters and teachers alike to move from program to program. A "Menu-driven" program is set up to guide the user, step by step, through every task.

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The beginning microcomputer user may want to read through Section A of Chapter III, then take the manual to the microcomputer and run a few programs without using the management system. This will familiarize someone with the programs and will show someone how the programs will fit into classroom use. The experienced microcomputer user may just want to take the manual to the microcomputer and work with it enough to become familiar with the management system. One may then move directly into the management system referencing sections B and C of Chapter III.

Copyright Data

The programs on the Micro Math Magic disks are copyrighted and may not be copied or reproduced for any reason other than archival purposes.

According to copyright law, a SINGLE copy of each disk may be made for archival purposes. Therefore, the only reason for which a disk may be copied is to make one backup copy. The backup copy could be used should the original disk become damaged in use. A disk may not be copied to make other disks to use without prior written permission from Deegan Learning Materials.

Please note that the documentation with the Micro Math Magic disks, including the Teacher's Manual, is also copyrighted and may not be copied or reproduced without permission.

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MICRO MATH MAGIC TEACHER'S MANUAL:
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These programs were developed at Hoover Elementary School in Mankato, Minnesota, as part of a Title IV-C project: "MICRO-MATH-MAGIC".

The concepts for the Micro Math Magic Program were designed by Gerald D. Hansen, Karen Hopkins, Edith Hopman, and Curtis Schull.

Chapter I: Educational Benefits From, Advantages of, and Application of Using the Micro Math Magic Program

Many facets of the Micro Math Magic program will benefit students and teachers who utilize the specific strengths of the program. The program does the following:

FREES THE TEACHER: Using the microcomputer programs, the teacher is free to do more teaching.

MOTIVATES THE STUDENT: Students who have used these programs came to believe that it is fun to do math. This is a significant aid to learning. Use of the programs motivates both the high-ability student and the low-ability student.

BUILDS SKILLS: Students using these programs build stronger math skills. This has been supported by field-testing evaluation.

GUIDES STUDENTS: The tutorial programs give a clear guide to new concepts being learned and students can review the process as many times as may be necessary.

REINFORCES IMMEDIATELY: The student knows immediately whether or not the problem just worked is correct, and before leaving the terminal the student can see the total score and elapsed time (if there is a clock) printed on the screen.

MEASURES GROWTH: In field testing, parents said children were excited to see their growth from day to day. The students remember the last score and time, and are pleased when they increase the score or decrease the time.

POSITIVELY REINFORCES: Knowing they are using the programs to improve their math skills, students are rewarded by being presented new problems when they provide a correct answer to a problem.

PATIENTLY HELPS: The programs are set up so that they become a patient and private tutor for the student who lacks confidence.

ASSISTS TEACHER: The use of the microcomputer programs assists the teacher throughout the day by drilling, reinforcing, scoring, and recording data for each student.

PROVIDES REVIEW: Students can review the process in any program as many times as it is necessary.

SEQUENCES STEPS: The programs are very carefully designed so that there are very gradual sequential steps which move the student through each topic area.

PROVIDES BASIC MATHEMATICS CURRICULUM COVERAGE: The programs cover the basic skill areas of mathematics in grades two through six. A teacher can be confident that there is a program to support every area of the mathematics curriculum that generally will be covered in these grade levels.

SELF-CORRECTS: Each program is self-correcting, and the scores are maintained for use by the teacher.

PRESENTS EXCELLENT WORD PROBLEMS: The word problems cover practical situations which students can understand, direct the students in setting up correct problem-solving forms, and encourage a thorough understanding of the problem by the student because the answer is labeled.

INCLUDES A VARIETY OF GRAPHICS: The programs include a wide variety of graphic routines—i.e.: white answers flash when an answer is incorrect; there is a round "Cursor" for multiplication and a square one for division. The graphics capture student interest and make very clear to students which numbers belong to the problem and which are a student's numbers.

INCLUDES INSTRUCTIONAL USE OF COLOR: The wide variety of colors in which the problems are printed was carefully chosen to assist students to learn. Instructional use of color enhances the image presented and assists in clarifying concepts. The student's numbers appear in a color different from those which the computer has on the screen. The correct answer is shown in a color different from both the problem and an incorrect answer.

ESTABLISHES MINIMUM COMPETENCY CHECKS: The programs are set up so that it is easy to check to determine if a student has passed the minimum competency requirements a district might have established.

PROVIDES INSTANT INFORMATION: The use of the management system with the programs provides teachers with instant access to excellent information about each student. The student data may be used in a print-out at parent conferences, in a print-out posted in the classroom so children can compare their data, and daily by teachers as a progress check, similar to correcting papers.

CAREFULLY SCREENS PROBLEMS: The problems presented to students in each set are very carefully screened and graded so that only problems of that particular selected level will appear.

SUPPLEMENTS INSTRUCTION: The programs are designed to be a valuable supplement to the classroom math instruction. They are not intended to be a self-contained math curriculum.

INDIVIDUALIZES INSTRUCTION: The programs are written to provide the teacher with a wide variety of selections which may be related to the specific needs of each child.

PROVIDES A DIFFERENT APPROACH: Each child learns differently, and the microcomputer approach provides a different way to learn the concepts being taught. If a child tires of the pencil/paper method, the microcomputer is a new and different way to learn.

Chapter II: Content of Disks

The following pages contain brief summaries of the programs on each disk. The number and the title of a disk are at the top of the beginning page for each disk. The number and title also appear above the sample problems for each disk.

The number of each of the programs on a disk is in parentheses and is the first item of information about each program on the disk.

The program name follows each number. Sometimes the name also includes a number. When it does, the number will be spelled out. Example: (7) Place Value Four. In this case, Place Value Four is program number 7 on a disk.

Details of the program's content follow the name.

Beneath the listing of all the programs on a disk is information about the type of program, the grade level for which it is intended, and a description of the programs.

This information is followed by sample problems from the programs on the disk.

Disk 1. Introduction

(1) Learning to Use the Keyboard - introduces the student to the use of the Apple keyboard.

(2) Even and Odd - identification of numerals as odd or even. (20 problems)

(3) Greater Than/Less Than - comparing numbers of three and four digits by using > and < signs. (20 problems)

(4) Place Value One - identification of place value for any digit in a numeral 11 through 100 with the answer choices listed in order. (Ex: a = ones, b = tens, c = hundreds) (15 problems)

(5) Place Value Two - identification of place value for any digit in a numeral 11 through 100 with the answer choices listed in mixed order. (15 problems)

(6) Place Value Three - identification of place value for any digit in a numeral through 999,999 with the answer choices listed in order. (Ex: a = ones, b = tens) (20 problems)

(7) Place Value Four - identification of place value for any digit in a numeral through 999,999 with answer choices listed in mixed order. (Ex: a = tens, b = one thousands) (20 problems)

(8) Place Value Five - identification of place value for any digit in a numeral through 999,999,999 with answer choices listed in mixed order. (20 problems)

(9) Ordering Numerals - ordering sets of three or four numbers from least to greatest, increasing in difficulty from tens to thousands. (15 problems)

(10) Expanded Numerals - writing expanded form of standard numerals.

Type of Programs: Introduction to the Number System.

Grade Level: Primary and up.

Program Description:

These 10 programs are designed to acquaint the user with the number system.

Learning to Use the Keyboard: Introduces the student to the operation of the Apple microcomputer. Acquaints the beginner with the keyboard and operational directions.

The Number System: These programs give drill and practice in familiarizing students with the number system including Odd and Even, Greater Than/Less Than, Place Value, Ordering Numbers, and Expanded Numerals.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your computer has a clock, the time used will also be shown.

Sample Problems - Disk 1 (Introduction)

EVEN and ODD

-Computer selects random number
-Prints it on screen
-Asks if it is odd or even

95
Is this number odd or even?
(Enter "O" or "E")

PLACE VALUE TWO

As Place Value One except the answer choices listed in mixed order

897
A = hundreds
B = ones
C = tens

GREATER THAN / LESS THAN

-Computer selects random numbers
-Prints both on screen with a flashing dot between them
-Instructions tell us of keys

5146 : 9045

ORDERING NUMERALS

-Sets of 3-4 numbers
-Asked to order them least to greatest

Arrange these numbers in order from least to greatest

A	B	C	D
51	29	72	23

Instead of typing in the number itself, just type in the letter above the number

PLACE VALUE ONE

-Computer selects random number
-Prints it on screen with one digit in a different color
-Asks what value the numeral is

438

A = ones
B = tens
C = hundreds

EXPANDED NUMERALS

Writing expanded forms of standard numerals

In this exercise you will be given ten numbers and asked to expand each one
Example:
5386 = 5000+300+80+6
Expand this number: 9,716

Disk 2. Rounding/Estimation

(1) Rounding One - two-digit numbers rounded to the nearest 10. (20 problems)

(2) Rounding Two - three-digit numbers rounded to the nearest 10. (20 problems)

(3) Rounding Three - three-digit numbers rounded to the nearest 100. (20 problems)

(4) Rounding Four - four-digit numbers rounded to the nearest 100. (20 problems)

(5) Rounding Five - mixed rounding — numbers of two, three, and four digits are rounded to the nearest 10 or 100. (20 problems)

(6) Estimation One - estimate the sum of two numbers by rounding. (20 problems)

(7) Estimation Two - estimate the difference between two numbers by rounding. (20 problems)

(8) Estimation Three - estimate the product of two numbers by rounding. (20 problems)

Type of Programs: Drill, Practice, and Reinforcement

Grade Level: Primary and up

Program Description:

Rounding: These five programs are sequential in developing the skill of rounding two-digit, three-digit, and four-digit numbers to the nearest 10 and 100.

Estimation: These three programs ask the user to estimate the sums, differences, and products by using rounded numbers. The student is allowed two attempts in each step of solving the problem.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 2 (Rounding/Estimation)

ROUNDING ONE
-Rounding to 10
-Two-digit number

27
Round the number to the nearest 10

ROUNDING THREE
-Rounding to 100
-Three-digit number

570
Round the number to the nearest 100

ROUNDING FOUR
-Rounding to 100
-Four-digit number

5964
Round the number to the nearest 100

ESTIMATION THREE (multiplication)
Estimate the product of two numbers by rounding

813 × 52 = ?
-Round 813 to the nearest 100
-Type in your answer and press the Return key

813 × 52 =
800 ×
-Round 52 to the nearest 10
-Type in your answer and press Return

813 × 52 = ?
800 × 50 =
What is the answer?

813 × 52 = ?
800 × 50 = 40,000
That's Right

Disk 3. Addition

(1) Add One - basic facts, sums to 9. (20 problems)

(2) Add Two - basic facts, sums of 10-18. (20 problems)

(3) Add Three - basic 75 addition facts. (75 problems)

(4) Add Four - columnar addition of three single digits. (20 problems)

(5) Add Five - addition with one renaming. (20 problems)

(6) Add Six - two consecutive renamings possible. (20 problems)

(7) Add Seven - three consecutive renamings possible. (10 problems)

(8) Add Eight - addition with multiple renamings. (10 problems)

(9) Add Nine - addition chart - a 10 × 10 grid appears on screen; a marker moves from box to box; when it stops, the student adds to find the number for that box. (20 problems)

Type of Programs: Drill and Practice

Grade Level: Primary, intermediate, and up

Program Description:

These nine programs constitute a series of sequential steps in the development of addition skills. Specific directions are given at the beginning of each program run as needed. After an answer is given, the problem is recorded as correct or incorrect. If correct, a new problem appears; if incorrect, the correct answer is shown. In some programs, the student is asked to work the problem a second time.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time also will be shown.

Sample Problems - Disk 3 (Addition)

ADD ONE

-Basic facts
-Sums to nine

```
  4
+ 4
```

ADD FIVE

-One renaming

```
  77
+ 44
```

ADD THREE

-Basic addition facts

```
  9
+ 7
```

ADD SIX

-Two consecutive renamings possible

```
  408
+ 253
```

ADD FOUR

-Columnar addition
-Three single digits

```
  4
  2
+ 1
```

ADD EIGHT

-Multiple renamings

```
  9955
  2596
+ 2282
```

Disk 4. Subtraction

(1) Subtract One - basic facts - minuends 1 through 10. (20 problems)

(2) Subtract Two - basic facts - minuends 11 through 18. (20 problems)

(3) Subtract Three - basic subtraction facts. (75 problems)

(4) Subtract Four - subtraction of two-digit numbers - no borrowing. (20 problems)

(5) Subtract Five - subtraction with borrowing from the tens. (20 problems)

(6) Subtract Six - subtraction with multiple borrowing. (20 problems)

(7) Subtract Seven - subtraction using zeros in multiple borrowing. (20 problems)

Type of Programs: Drill and Practice

Grade Level: Primary, intermediate, and up

Program Description:

These seven programs constitute a series of sequential steps in the development of subtraction skills. Specific directions are given at the beginning of each program run as needed. After an answer is given, the problem is recorded as correct or incorrect. If correct, a new problem appears; if incorrect, the correct answer is shown. In some programs, the student is asked to work the problem a second time.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 4 (Subtraction)

SUBTRACT ONE
-Basic facts
-Minuends through 10

$$\begin{array}{r} 9 \\ -9 \\ \hline \end{array}$$

SUBTRACT TWO
-Basic facts
-Minuends through 18

$$\begin{array}{r} 10 \\ -6 \\ \hline \end{array}$$

SUBTRACT THREE
-Basic facts—all

$$\begin{array}{r} 14 \\ -8 \\ \hline \end{array}$$

SUBTRACT FOUR
-Two-digit numbers
-No borrowing

$$\begin{array}{r} 39 \\ -14 \\ \hline \end{array}$$

SUBTRACT FIVE
-Borrowing from the tens only

$$\begin{array}{r} 684 \\ -67 \\ \hline \end{array}$$

SUBTRACT SIX
-Multiple borrowing

$$\begin{array}{r} 902 \\ -634 \\ \hline \end{array}$$

Disk 5. Multiplication

(1) Multiplication One - basic multiplication facts of 2, 3, 4, and 5's. (20 problems)

(2) Multiplication Two - basic multiplication facts of 0, 1, 6, 7, 8, and 9's. (20 problems)

(3) Multiplication Three - all basic multiplication facts, randomly selected. (75 problems)

(4) Multiplication Four - multiplication by a single digit with carrying. (15 problems)

(5) Multiplication Five - multiplication by 10 and 100. (15 problems)

(6) Multiplication Six - multiplication by 10, 100, and 1,000. (15 problems)

(7) Multiplication Seven - multiplication by two-digit or three-digit numbers using multiples of 10 and 100. (15 problems)

(8) Multiplication Eight - multiplication by two-digit or three-digit numbers using multiples of 10, 100, 1,000. (15 problems)

(9) Multiplication Nine - multiplication of two-digit or three-digit numbers by a two-digit number. (Tutorial.) (10 problems)

(10) Multiplication Ten - multiplication of a two-digit, three-digit, or four-digit number by a two-digit number. (Nontutorial.) (10 problems)

(11) Multiplication Eleven - multiplication of a two-digit or three-digit number by a three-digit number. (10 problems)

(12) Multiplication Twelve - multiplication of a three-digit or four-digit number by a three-digit number with zeros in the multiplier. (10 problems)

(13) Multiplication Thirteen - multiplication chart - a 10 × 10 grid appears on the screen; a marker moves from box to box; when it stops, the student multiplies to find the number for that box. (20 problems)

Type of Programs: Drill and Practice

Grade Level: Intermediate and up

Program Description:

These 13 programs constitute a series of sequential steps in the development of multiplication skills. Specific directions are given at the beginning of each program run as needed.

Tutorial programs are included to reinforce new and more difficult processes. The student is guided through the steps and is not permitted to give an incorrect answer.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 5 (Multiplication)

MULTIPLICATION ONE
Basic facts of 2, 3, 4, or 5

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

MULTIPLICATION THREE
All basic multiplication facts

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

MULTIPLICATION FOUR
Multiplication of 2-digit or 3-digit number by a single-digit number

$$\begin{array}{r} 376 \\ \times 5 \\ \hline \end{array}$$

MULTIPLICATION SEVEN
Multiplication of a 2-digit or 3-digit number by multiples of 10 or 100

$$\begin{array}{r} 672 \\ \times 800 \\ \hline \end{array}$$

MULTIPLICATION NINE
Multiplication of a 2-digit or 3-digit number by a 2-digit number (tutorial)

$$\begin{array}{r} 432 \\ \times 26 \\ \hline \end{array}$$

MULTIPLICATION TWELVE
Multiplication of 3-digit or 4-digit number by a 3-digit number with zeros in it

$$\begin{array}{r} 7141 \\ \times 604 \\ \hline \end{array}$$

Disk 6. Division

(1) Division One - basic facts - divisors of 2, 3, 4, and 5. (20 problems)

(2) Division Two - basic facts - divisors of 6, 7, 8, and 9. (20 problems)

(3) Division Three - basic division facts randomly selected. (75 problems)

(4) Division Four - simple division - basic facts with a remainder. (20 problems)

(5) Division Five - multi-digit answers with no remainders using one-digit divisor. (20 problems)

(6) Division Six - multi-digit answer with remainder possible using one-digit divisor. (15 problems)

(7) Division Seven - multi-digit answer with remainder possible using two-digit divisor. (Tutorial) (15 problems)

(8) Division Eight - multi-digit answer with remainder possible using two-digit divisor. (Non-tutorial) (5 problems)

Type of Programs: Drill and Practice

Grade Level: Intermediate and up

Program Description:

These eight programs constitute a series of sequential steps in the development of division skills. Specific directions are given at the beginning of each program run as needed.

Tutorial programs are included to reinforce new and more difficult processes. The student is guided through the steps and is not permitted to give an incorrect answer.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 6 (Division)

DIVISION ONE
- Basic facts
- Divisors of 2, 3, 4, and 5

$5\overline{)35}$

DIVISION THREE
- Basic facts (all)

$9\overline{)45}$

DIVISION FOUR
- Simple division with remainder

$4\overline{)33}$

DIVISION FIVE
- One-digit divisor
- Multiple-digit answer
- No remainder possible

$7\overline{)966}$

DIVISION SIX
- One-digit divisor
- Multiple-digit answer
- Remainder possible

$9\overline{)420}$

DIVISION SEVEN
- (Tutorial)
- Two-digit divisor
- Multiple-digit answer
- Remainder possible

$38\overline{)3421}$

Disk 7. Word Problems

(1) Word Problems One – (addition) word problems using addition process. (5 problems)

(2) Word Problems Two – (subtraction) word problems using subtraction process. (5 problems)

(3) Word Problems Three – (multiplication) word problems using multiplication process. (5 problems)

(4) Word Problems Four – (division) word problems using division process. (5 problems)

(5) Word Problems Five – (mixed) random selection of problems from the four previous problems. (5 problems)

Type of Programs: Problem Solving, including design of problems.

Grade Level: Intermediate and up

Program Description:

These five programs are designed to practice skills in problem solving using addition, subtraction, multiplication, or division. There is a "bank" of 20 word problems developed for each process using the same range of skills developed in basic disks. The computer selects five of these at random for each student.

The student is required to read a problem, determine pertinent information, and set up the problem in its correct form. Using paper and pencil, the student solves the problem and responds with the answer. To complete each problem, one must identify the correct label for the answer. It is necessary to follow the specific directions for each program.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 7 (Word Problems)

WORD PROBLEMS ONE
-Addition
-(May need paper & pencil)

Tom has 87 baseball cards. Charles has collected 42. How many cards do the boys have?

How many numbers do you want to add together?

What is the first number?
What is the second number?

87
+42

Here is how you chose to set up this problem. Work it out on paper and then press any key when you have finished.

What is your final answer?

So your answer is
(1) 129 cards
(2) 129 boys
(3) 129 baseballs
Enter which (1, 2, or 3)?

That's Right!

WORD PROBLEMS THREE
-Multiplication
-(May need paper & pencil)

Joan practices the piano for two hours each day. How many hours will she have practiced in 30 days?

Enter the two numbers that you want to multiply together.

What is the larger number?

What is the other number?

30
×2

Here is how you chose to set up this problem. Work it out on paper and then press any key when you have finished.

What is your final answer?

So your answer is
(1) 60 hours
(2) 60 weeks
(3) 60 lessons
Enter which (1, 2, or 3)?

That's Right!

continued on next page

Sample Problems - Disk 7 (cont.)

WORD PROBLEMS FOUR
-Division
-(May need paper & pencil)

Sue has 40 cents to spend for pencils. Pencils are 7 cents each. How many pencils can she buy?

Leave the remainder in cents.

What is the number that you want to divide?

What is the number that you want to divide by?

$7\overline{)40}$ Here is how you chose to set up this problem. Work it out on paper and then press any key when you have finished.

What is your final answer?

So your answer is
(1) 5 cents
(2) 5 rulers
(3) 5 pencils
Enter which (1, 2, or 3)?

That's Right!

What's the remainder?

Then your remainder is:
(1) 5 cents
(2) 5 rulers
(3) 5 pencils
Enter which (1, 2, or 3)?

That's Right!

Disk 8. Geometry/Measurement

(1) Geometry - Points and Lines - defines line segments by end points. Student identifies intersecting and parallel lines. (20 problems)

(2) Geometry - Rays and Angles - defines rays and angles. Student identifies and labels right angles. (15 problems)

(3) Geometry - Geometric Shapes - student identifies various shapes including polygon, triangle, quadrilateral, pentagon, hexagon, and octagon. (15 problems)

(4) Geometry - Radius and Diameter - defines radius and diameter. Student identifies radius and/or diameter. (20 problems)

(5) Measurement - Beginning Metric - introduction to basic metric terms of measurement. (15 problems)

(6) Measurement - English - introduction to English measurement of time, volume, weight, and distance. (15 problems)

Type of Programs: Introduction and Identification

Grade Level: Intermediate and up

Program Description:

Geometry - These four programs provide a student practice in identifying basic geometric concepts as listed above.

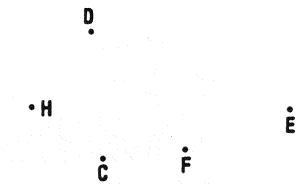
Measurement - These two programs reinforce introduction to the basic units of metric and English measurement. Graphics in the instructions illustrate and teach the basic units of measurement.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 8 (Geometry/Measurement)

GEOMETRY ONE
-Points and lines

In this exercise you will be shown some points on the screen. It is up to you to identify as many line segments as you can. Type in the letters of the end points and watch as I draw in the segment for you. you may use each end point more than once.



Type in the end point of one line segment and press the Return key. Find all the segments possible and type Return again.

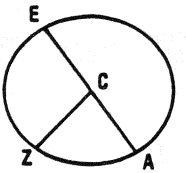
GEOMETRY THREE
-Geometric shapes

1. The shape shown is a
   A. Triangle
   B. Rectangle
   C. Square
   D. Pentagon
   E. Hexagon
   F. Octagon
   G. Quadrilateral
   H. Parallelogram

Please type the letter of the shape shown and then press the Return key.

GEOMETRY FOUR
-Radius and Diameter

NOTE: Step by step the concept of radius and then diameter is built by diagrams and flashing lines. At the end of the lesson the computer draws a diagram and asks some questions. (sample):



Type in the end points of a segment that is a diameter.

MEASUREMENT ONE
-Beginning metric
-Introduction to basic terms

NOTE: The computer develops an awareness of the meaning of different metric units by means of illustrations of common things in a student's life. Then the computer asks questions about them.

Example:
You weigh about
A. 35 grams
B. 350 kilograms
C. 35 kilograms

What is your answer?

Disk 9. Time/Money

(1) Telling Time - from a clock display, the student tells time using quarter hours. (10 problems)

(2) Telling Time - from a clock display, the student tells time using minutes. (15 problems)

(3) Telling Time - from a clock display, the student determines time lapse within an hour. (8 problems)

(4) Making Change - student decides correct change for amount up to $10.00. (Tutorial) (15 problems)

(5) Making Change - student decides correct change for amounts up to $10.00 (Nontutorial) (15 problems)

Type of Programs: Practice

Grade Level: Primary and up

Program Description:

Telling Time - These three programs are sequential in the development of telling time. Programs 1 and 2: Student selects one of three choices for the correct time shown on the clock face. Program 3: Student identifies the time lapse for answering the question, "How many minutes have gone by?" Errors are explained and student is allowed time to study the problem again.

Making Change: These two programs present problems concerning making change. Program 4 is tutorial in its approach to making change. The computer does not accept an incorrect response. Problems appear in increasing difficulty. Program 5 is the same as Program 4, but the student proceeds through the problems independently.

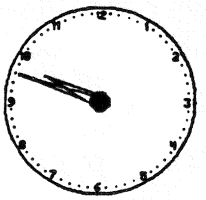
After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 9 (Time/Money)

TELLING TIME TWO

-By minutes

The computer generates a clock face indicating time in one-minute units. The display at the side shows three different times. The student types the letters of the correct answer. If correct, the clock becomes a smiling face. If wrong, the correct answer is shown and a sad face appears.



A. 9:44

B. 9:48

C. 10:58

What time is it?
Type the letter of the correct time.

MAKING CHANGE ONE

-(Tutorial)
-Decide correct change
-Amounts up to $10.00

The computer generates the picture of a change drawer with a slot for pennies, a slot for nickels, and slots for other denominations of coins. A problem is presented beneath the "drawer" and the student is asked to make change using as few coins as possible. To help the students work through the problem, the computer asks for pennies first, then nickels, and other coins, and shows the number (which the student gives) inside the proper change drawer.

You have spent $0.82 from $2.00
-What is the least number of pennies?
(Wait for answer)
-What is the least number of nickels?
(Wait for answer)

Disk 10. Averages/Decimals

(1) Averages One - finding averages of daily temperatures. (6 problems)

(2) Averages Two - finding averages of basketball scores. (5 problems)

(3) Averages Three - finding averages of random number sets. (5 problems)

(4) Decimals One - writing decimals from written words. (20 problems)

(5) Decimals Two - comparing decimals using > and < . (Tenths, hundredths, and thousandths.) (20 problems)

(6) Decimals Three - ordering sets of decimals from least to greatest. (15 problems)

Type of Programs: Practice

Grade Level: Intermediate and up

Program Description:

Averages - These three programs involve the student in finding averages for daily temperatures, game scores, and sets of numbers. When a wrong answer is given, the student is shown the steps necessary to find the average. Work requires paper and pencil.

Decimals - These three programs involve the beginning steps of working with decimals. The student reads and writes decimals from words using tenths and hundredths and also compares and orders decimals including tenths, hundredths, and thousandths. If student gives wrong answer, graphic help appears on the screen to clarify understanding.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 10 (Averages/Decimals)

AVERAGES ONE

-Daily temperatures

The computer generates a grid with spaces for the temperature three times each day. Temperatures are then filled in one day at a time, and the student is asked for the average temperature for that day.

If correct, the answer appears in the proper box. If wrong, the student gets a second chance. If it is still wrong, the computer slowly works it all out on the side of the screen.

TIME	MON	TUES	WED	THUR	FRI
6 AM	17				
NOON	34				
6 PM	24				
AVG	?				

-What is the average temperature for Monday?
(Wait for answer)
-What is the average temperature for Tuesday?
(Wait for answer)
(The remaining days follow.)

DECIMALS TWO

-Comparing decimals
-Using > and <
-Tenths, hundredths, and thousandths

.5 ● .9

-(Waits for answer)
-(Gives a few problems at this level)

.58 ● .33

-(Waits for answer)
-(Gives a few problems at this level)

.288 ● .457

-(Waits for answer)
-(Gives a few problems at this level)

Disk 11. Fractions (Problems 1-6)

(1) Fractions One – identifying and writing fractions that are parts of a whole. (10 problems)

(2) Fractions Two – identifying and writing fractions that are parts of a group. (10 problems)

(3) Fractions Three – writing fractions from written words. (20 problems)

(4) Fractions Four – comparing two fractions using > and < . (15 problems)

(5) Fractions Five – student views shapes and writes a mixed number as well as an improper fraction for the pictures. (15 problems)

(6) Fractions Six – adding fractions having the same denominators. (15 problems)

Type of Programs: Introduction and Practice

Grade Level: Primary and intermediate

Program Description:

> The fraction programs are a series of 13 sequential steps in the development of understanding, writing, and working with fractions. Because of the length of this series, the problems are on two disks. Disk 11 includes steps 1-6 and Disk 12 includes steps 7-13.

The six programs on Disk 11 are sequential in the development of fraction skills. Specific directions are given with each program. Graphics illustrate and teach understandings.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

Sample Problems - Disk 11 (Fractions 1-6)

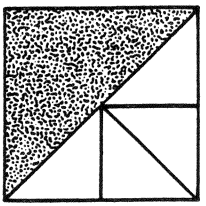
FRACTIONS ONE

-Parts of a whole

The computer generates a design and divides it into parts, coloring some parts white. The student is asked to give a fraction telling how much of the figure is white.

To help the students along, the computer first asks for the denominator, then the numerator. It will accept an unreduced fraction (3/6) as a correct answer.

For each exercise, give a fraction to tell how much of the figure is white.



FRACTIONS THREE

-Writing fractions from written words

Write a fraction from the words. Type the fraction as you would write it — the numerator first.

TWENTY-THREE SIXTEENTHS

FRACTIONS FIVE

-Mixed numbers and improper fractions

The computer generates a set of shapes, shading some parts in. The student is asked to tell what part is shaded in, first as a mixed number, then as an improper fraction.

2 1/3 = 7/3

Disk 12. Fractions (Problems 7-13)

(7) Fractions Seven - subtracting fractions having the same denominators. (15 problems)
(8) Fractions Eight - student views two shapes and identifies the shaded sections as equal fractions. (Example: 1/3 and 2/6.) (10 problems)
(9) Fractions Nine - finding the least common multiple. (Tutorial) (10 problems)
(10) Fractions Ten - finding the least common denominator of two given fractions. (10 problems)
(11) Fractions Eleven - reducing fractions to lowest terms when possible. (10 problems)
(12) Fractions Twelve - adding two unlike fractions by finding the least common denominator. (10 problems)
(13) Fractions Thirteen - subtracting two unlike fractions by finding the least common denominator. (10 problems)

Type of Programs: Drill and Practice

Grade Level: Intermediate and up

Program Description:

These seven programs continue the development of more advanced fraction skills. Charts, graphs, and tutorial helps are included to increase understanding.

After a completed lesson, the computer will display the number of problems correct, the number wrong, and the number of problems tried. If your microcomputer has a clock, the elapsed time will also be shown.

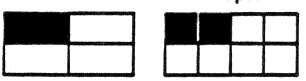
(Two sets of program numbers appear on the Main Menu in Disk 12. The numbers 7 through 13 are in parentheses at the right of the screen just before the total number of problems in the program. However, when you type on the keyboard the number of the program you want to use, type the number at the left of the screen. For example, if you want to use (FR#8), Equal Fractions, type the number 2 to bring up the program. If you type 7 through 13, you remain at the Main Menu.)

Sample Problems - Disk 12 (Fractions 7-13)

FRACTIONS EIGHT

-Comparing fractions using shapes

The computer draws two identical shapes and shades in two equal parts, but divides one shape into smaller parts. The student is asked to write the fraction for each shape.



-The left denominator is?
-The left numerator is?
-The right denominator is?
-The right numerator is?

FRACTIONS ELEVEN

-Reducing fractions

The computer randomly generates a proper fraction and asks the student to reduce it to lowest forms (numerator first).

$$\frac{57}{63} = ?$$

FRACTIONS THIRTEEN

-Subtracting unlike fractions

The computer randomly generates two proper fractions with different denominators and sets up the problem as illustrated below. The student is first asked to find the least common denominator, then is asked the other questions listed below.

$$\frac{2}{4} =$$

$$-\frac{1}{5} =$$

The least common denominator is?

Type in the numerators (for the two fractions).

Type in the denominator (for the answer).

Type in the numerator (for the answer).

If the student gets any part wrong, the student is given one more chance, and then the correct answer is shown.

Chapter III: Using the Micro Math Magic Program

The Micro Math Magic program is easy to use. However, the explanation of the relatively simple process involved in using the program cannot be too brief if the process is to be adequately presented. The following explanations of the use of the programs are presented in as few steps as possible in order to avoid too lengthy a presentation.

Overview

The Micro Math Magic series of programs are designed to be a mathematics instructional support system. The programs have been designed by experienced teachers to assist students and teachers in grades two through six with math instruction. The programs help the teacher by presenting math concepts in another medium, as well as by providing an easy-to-use management system which measures student progress. Micro Math Magic provides students a highly-motivating way in which to work with their math skills. There is also instant reinforcement of a student's efforts. The programs are designed to help the teacher and supplement any math series.

Without the management system, the programs are an excellent method of reinforcing the concepts being taught. In this same mode, they also become an excellent method of demonstrating certain concepts in front of the class.

With the management system, the programs become the ultimate in a classroom instructional support system. They automatically keep records for the teacher as the students do their assignments. The records provide information which is helpful to the teacher in the diagnosis of student progress. The records also are an item that could be shared at parent conferences.

Chapter III

Section A: Using the Micro Math Magic Program without the Management System

The Micro Math Magic program was written to be "user-friendly" - easy to use.

The following information will enable you to use the Micro Math Magic programs.

Information about working with the management system in addition to using the programs is offered in Section B of this chapter.

To use a program you begin by following three steps in order:

1. Insert a disk into the disk drive

2. Turn on either the monitor (the television-like picture tube) or the color television set if one is being used instead of a monitor.

3. Turn on the microcomputer. The on/off switch is at the lower left of the back of the base panel.

The information on the disk is now being transmitted from the disk drive to the microcomputer. Whenever this occurs, or if information is being transmitted from the microcomputer to the disk drive, a red light on the disk drive goes on.

NEVER type anything on the keyboard while the red light is on. If you enter information when the light is on, the program or the file data could be destroyed.

It takes about 15 seconds of loading time before anything appears on the monitor screen. The first thing to appear will be the Micro Math Magic logo.

4. The Main "Menu" appears on the screen after the logo has appeared. Select from the Menu the option you want and type the number of that option. Then press the Return key on the keyboard.

You can see what your selection is by looking at the "Cursor" - the small, blinking, white box which appears at various places on the screen as an indicator, in this instance, of where what you typed appears on the screen.

5. Next, a message appears on the screen: "Please enter your 'Student I.D.' if you want files kept (use the management system), or Press 'Return' if you do not want files kept." You are not using the management system now. Therefore, press the Return key.

You have now completed the steps necessary to become involved in the use of the program. To complete a program on the disk, just continue to follow the computer's directions as they appear on the screen. When you answer a problem, type the number(s) of the answer and press Return.

At the end of each program, after a brief pause, a summary appears telling you how many problems you got correct, how many were wrong, and the total number of problems you worked.

Then a message appears on the screen to "Please get the next student." Then the Main Menu appears again.

You may proceed with another program by repeating steps 4) and 5).

Leaving Early - If you want to stop before finishing all the problems on a program, press the ESC (Escape) key at any point where you would type an answer. When you press this key, the summary appears on the screen followed by the request to get the next student, and the Main Menu then reappears. After checking to see that the red light is off, turn off the monitor, remove the disk from the disk drive, and turn off the microcomputer.

Mistakes - Should you make a mistake while typing, you may correct the mistake if you react to it before you've pressed the Return key. To do so, press the Left-hand Arrow key, which is at the lower right-hand corner of the keyboard. One letter, or one number, is erased each time you press this key.

Once you have pressed Return, the computer treats your mistaken entry as an error.

Quitting - When a program has ended, the Main Menu reappears on the screen and you may turn off the computer after checking to see that the red light is off.

Chapter III

Section B: Using the Micro Math Magic Program with the Management System

It is easy to use the Micro Math Magic management system because, like the Micro Math Magic program, it, too, is Menu-driven. Using the program with the management system does involve a few more steps than does using the program without it.

Those who choose to use the management system will find it very rewarding. It benefits the teacher, the students, administrators, and parents.

It takes 10 to 15 minutes to set up the management system by entering into the file a "Class List" which can be stored on a disk. To enter the list, you need the names of the students in one class who will be using the program. You also need a "Class I.D."

The Class I.D. is a four-character code identifying one class of students. The first character of the code must be a letter. The other three characters may be letters, numbers, dashes, or any combination of these three items. (Example: CS4-)

A suggestion for the Class I.D. code is to use the teacher's initials for the first two characters, the number of the class grade level for the third character, and a dash for the fourth character.

Using a dash for the fourth character separates the Class I.D. code from the two numbers added to it to make up the six-character "Student I.D." code.

The Class I.D. is unique to the disk on which it is stored. This means that on any one disk there can be only one Class I.D. with exactly the same four characters. There can be, however, several different Class I.Ds. filed on one disk.

The Student I.D. is set up when a list of the names of students in a class is first entered into the computer. At this time the computer automatically assigns two numbers for each name entered and combines these two numbers with the one Class I.D. code to form a Student I.D. for each student.

For example, if the Class I.D. would be CS4- and the computer added 0 and 7 for the name, that student's Student I.D. would be CS4-07.

The first thing you do to set up your Micro Math Magic management system is to enter the class names into the file. To set up a file of class names:

1. Bring up the Main Menu by inserting the disk and turning on the monitor and the microcomputer.

2. For the number of the option you want from the Menu, type TMENU. (This is what is typed even though it is not one of the options appearing on the screen. It does not appear on the Menu as an option because you do not want this code to be available to students.) "TMENU" is a special code enabling you to work inside the program. After typing TMENU, press the Return key and a new Menu – the Teacher's Menu – appears. The Teacher's Menu gives you a choice of working with files, the clock, a catalog, or returning to the Main Menu.

You should be aware that when working with the management system, the computer sometimes will pause several seconds while handling information. This is normal. If the red light on the disk drive should come on during such a pause, be sure not to touch the keyboard until the light goes off.

3. Your choice on the Teacher's Menu is "Work with files (names or data)." Type 1, the number of this option, and press Return. This brings up the File Menu, which gives you a choice of working with names or with data.

4. You want to work with student names, the first choice, so type 1 and press Return. This brings up another Menu, one showing all the things you can do with names. This is the Names Menu.

5. Among the choices on this Menu is "Start a new class." Type 1 and press Return.

6. The computer now asks for a Class I.D. When you enter the Class I.D. code for a particular class, the computer uses the code to identify this class in subsequent use of the management system. Type the Class I.D. code you have chosen for this class and press

Return. The computer checks to make sure the code you entered is acceptable, then asks you to:

7. "Please type in a name with a limit of 22 characters. Type 'End' to stop." Below this request the number 1 appears, followed by a question mark. This is indicated on the screen by the Cursor. Type a student's name beginning with the first name. Use the Space Bar to separate first and last names. Do not type END until you have typed all the names on the Class List.

A new number appears each time you type a name and press Return. Type in the next name and continue until you have typed all the names on the Class List.

Whenever you type a name, the computer asks if the name is "right" (is it spelled correctly?). If it is correct, answer yes by typing Y and press Return.

Should you notice an error in spelling before pressing Return, you can correct the mistake by using the Left-hand Arrow key.

Each time a name is entered, the computer automatically - you don't enter anything - assigns two numbers for that name to the Class I.D. code entered previously, thereby establishing a Student I.D. code for each name.

8. When you have typed the last name on your list of students and the next number appears on the screen, type END and press Return. A Class List for one class is now entered into the computer. However, you also want to store or save that list on the disk so that you can use it in the future.

The computer distinguishes between a "New Class List" and a "Loaded Class List." The New Class List is the one which you are just entering into the computer. A Loaded Class List is one which has been previously stored on a disk.

9. To store the New Class List on a disk, you want the third choice, "Save New Class List on the disk," from the new list of choices which now appear on the screen. Type 3 and press Return.

10. The computer now asks you to "Please take the disk on which you wish to save (store on a disk)

this data (the New Class List) and place it in (disk) drive #1." The disk on which you want to save the list is already in the disk drive, so just press Return. The data - the Class List - is now saved on the disk.

The red light on the disk drive will go on when the Class List is going between the computer and the disk, so do not do anything more until the light goes off.

11. The Names Menu now appears again on the screen and you may now save the Class List on one or more disks other than the one on which you already have saved it. You can do this without retyping the student names.

To save the list on another disk, you want the fifth choice from the Names Menu, "Save a class to a disk." Type 5 and press Return.

12. This returns you to the options which were before you in step 9). You are still working with a New Class List, so again type 3, "Save New Class List on the disk," and press Return.

13. Now when the computer asks you to "Please take the disk on which you wish to save this data and place it in drive #1," you replace the disk which you had in the disk drive with another Micro Math Magic disk on which you wish to save the Class List. Then press Return and the list will be entered and stored on this disk.

You repeat these steps - 11), 12), and 13) - for any other disk or disks on which you want to save this particular Class List.

Now you can save student records on any disk on which the Class List has been saved. The computer will keep records concerning what the students do while they are using a disk. Information about accessing the collected student data is presented in Section C of this chapter.

Students trigger the collection of data by entering their Student I.Ds. This is the combination of the four-character Class I.D. and the two-character "student number". The computer asks students to enter this six-character code each time they begin to use a Micro Math Magic program.

When a student types the code which is his or her Student I.D., the computer verifies the code entered by showing that student's name on the screen. The computer then records, and stores on the disk, the information relating to that student's use of the program.

Students, therefore, will need to know their Student I.Ds. so they can enter them when they use a program. It is easy to compile a written list of each student I.D. at the point where you have completed saving the Class List on one or more disks. At this point, the Names Menu again appears on the screen.

14. The sixth option on the Names Menu is "Display name/class." This is what you want to do in order to see the Class List, so type 6 and press Return.

15. The computer then asks, "Do you want to see just one name?" If you want to see the entire list, answer no by typing N and press Return.

Two lines now appear on the screen: "Press 'Return' to start the display (of names on the screen). Use 'CTRL-S' to stop and advance it." Press Return and the Class I.D. code for this class is displayed followed by a display of the names along with Student I.Ds. The names and I.Ds. roll down the screen.

If you want to stop the list at any point, perhaps to have more time to record the I.Ds., use "CTRL-S". This means pressing both the Control key and the S key at the same time. The list will stay where you stopped it until you start it rolling again by pressing the S key.

You will notice that following the final name you entered, five "spare" names appear and that each has been assigned a Student I.D. The computer does this automatically. Therefore, if new students come into the class one day, up to five of them can be assigned an existing Student I.D., and a new student can begin immediately to use the program. (When you want to replace a spare name with the name of a new student, you can do so by selecting the third choice, "Change a name," on the Name's Menu and proceeding as directed.)

When the final spare name has been presented, the computer asks you to press Return to continue. Until you do so, the list stays on the screen providing you with whatever time you need to finish recording I.Ds.

16. When you are finished, you may return to the Names Menu by pressing Return. You may leave working with names by typing 8 for "Exit working with names".

Should you want to see the Class List another time, you can repeat steps 14) and 15) when the Names Menu reappears.

Section C: Working with the Micro Math Magic Program's Management System

When a Class List is saved or stored on a disk, the computer will collect information about each student each time the student uses a program if the student begins by typing a Student I.D.

How does the teacher access the information which has been collected?

1. To do so, you need the disk on which the information is stored. Then you bring up the Main Menu by inserting the disk and turning on the monitor and the microcomputer.

2. For the number of the option you want from the Main Menu, type TMENU and press Return. This presents the Teacher's Menu.

3. You want the first choice on the Teacher's Menu - "Work with files (names or data)." Type 1 and press Return. This presents the File Menu.

4. The second choice on the File Menu is "Work with data." This is what you want to do, so type 2 and press Return. This presents the Data Menu which includes choices of printing, deleting, or saving data, or going to the Names Menu or to the Teacher's Menu.

There are many aspects to the Micro Math Magic management system. They all cannot be covered in the scope of this manual. What are presented in this section are the bare essentials for accessing and reviewing the student data.

However, since the Micro Math Magic program, including the management (record-keeping) system, is Menu-driven, you can use any aspect of this extensive and inclusive record-keeping system by selecting a Menu choice and then following each menu pathway, taking your directions from what appears on the screen.

All the aspects of the record-keeping system operate similarly to those covered in the steps presented here.

5. Your choice from the Data Menu now on the screen is going to be the first one, "Print data," because you want to look at data.

The term print, as used here, means presenting the data in a form you can see and read. You may print data on a printer, if there is one connected to your microcomputer, or you may "print" data on the monitor screen.

To "Print data," type 1 and press Return.

6. The computer now asks you to "Please put the disk that has the data to print in drive #1." You have already done this, so just press Return.

The request to put the disk in the disk drive is made so that when you do want to access information from other disks, you may insert one of them at this point without having to return to step 1).

7. After you press Return, the computer now goes to the disk, which may contain one or several Class I.Ds., and shows on the screen the codes for whatever Class I.Ds. are on the disk. The computer also asks, "What Class I.D. would you like to print?" Type the four-character Class I.D. code for the class you want and press Return.

This presents on the screen a report of how many records are on file for that Class I.D. A record is a line of information collected each time a student uses the programs on that disk.

If the microcomputer you use has a clock, a student's record will include the date and the hour and minute of that date, and the time the student spent working a program. The date and time of day appear under Date in a record. The elapsed time appears under ET.

8. If there are no records for the class whose I.D. you have entered, the computer tells you that there are none. It also says, "If there are no records in this class you may want to go back" and asks, "Do you want to continue?" This occurs both when there are records and when there are none. This gives you two options. One is to go back to the Data Menu. The other is to continue because there are records which have been saved and are on file. To continue, type Y and press Return.

9. The computer now asks you to select where you want to print the saved records: "Do you want information displayed on TV screen or paper copy (on the printer)?" If your choice is the screen, type S and press Return.

10. Another line then appears on the screen asking, "Do you want to print all the students?" This question appears if you chose to print on the screen or if you chose to print on the printer. If you want student data for the entire Class List, answer yes by typing Y and pressing Return.

11. The computer now gets from the disk all the data filed for all of the students on the Class List. It prints all the data for each student, one by one, on the screen (or on the printer if that is where you chose to print). Each student is listed by name and Student I.D.

12. After one student's data is printed, the computer says, "That is all the available data. Press the Space Bar to continue." The computer does not print the data for the next student until you press the Space Bar. This enables you to take as much time as you want to review the data.

However, when there is no data for students, the names are printed very quickly, along with the notation, "Has no data or breakout count".

The breakout count is the number of times a student, working on a program, stopped the program before that student's score could be recorded. This occurs if a student presses the Reset key. A record of breakouts is kept so that a teacher is alerted to students having this problem.

13. When the computer has finished printing data for all the students, it gives you the total number of records printed, and asks you to "Press the Return key to continue." Pressing the Return key brings up the Data Menu again.

You may now stay in the management system or return to the Teacher's Menu.

At step 10) there are two other choices besides printing data for all the students on the Class List.

You may choose instead to see data either for one student or for a group of two through eight students.

When you want data for one student or for a group, you answer no by typing N when asked "Do you want to print all the students?" You also press Return.

The computer then asks, "Do you want only one student?" If you do, answer yes by typing Y and pressing Return. Then the computer asks, "What is the number of the student at which I should start?" The number referred to in this question means the last two digits of a Student I.D. code. Type the two numbers for the student whose data you want to print and press Return. The computer then prints the data for that one student.

If you want data for a group – such as a reading group – you answer no by typing N when asked "Do you want only one student?"

Then the computer asks, "For how many students would you like to print data? (Limit of 8)?" Type the number you want. If it is a reading group of six students, you type 6 and press Return.

Then the computer asks you to "Type in one student number per line." Type the two-digit number for one student and press Return. Do the same for each of the students in the group. When you press Return after typing the number of the last student in the group, the computer prints the data for each of the students, holding each student's records on the screen until you press the Space Bar.

After the data for either one student or for a group has been printed, you are again at the point in step 13) where you may "Press the Return key to continue."

Chapter IV: Glossary

Abbreviations of Program Titles: These abbreviations appear under the heading "Code" in a display of students' records to indicate which program the student has run. They are listed at the end of this glossary.

Adapter Card: A printed-circuit board that fits into expansion slots in the microcomputer and increases the machine's capabilities; also called a "peripheral card".

Applesoft: An extended version of BASIC, a programming language, used with the Apple IIe microcomputer. Many earlier Apple microcomputer models have been adapted so that Applesoft can be used with these machines.

Available Data / Available Records: These are records in the Micro Math Magic management system made each time a student uses a program after entering a Student I.D. The computer counts the records and compiles a report. Occasionally there is a difference between the available data and the available records — the total number of records printed. This usually occurs when there was a breakout and the record was counted but was not put on the file because the program run was never completed. Thus the available data is less than the number of available records.

Backup: A backup copy is a copy you make of the original disk you purchased so that you have a copy to use if something happens to the original disk. Making a copy to have as a backup is permissible under copyright law. It is a violation of copyright to make a copy for any other reason without prior written consent.

Bank: A series of word problems for each of the five programs on Disk 7, Word Problems, in the Micro Math Magic program. Five problems in the series are selected at random by the microcomputer in each use of any of the programs.

Basic: An acronym for Beginner's All-purpose Symbolic Instruction Code. This is the programming language for most microcomputers. Applesoft is a version of basic.

Bit: A binary (the representation of numbers in powers of two) digit — 0 or 1. It is the smallest unit of information offering a choice between only two alternatives as in yes or no, on or off.

Boot: To boot the system means to start up a program; to load the Disk Operating System from the disk so that you can run the program on the microcomputer. With a Micro Math Magic program, you boot the system by just turning on the computer (after first turning on the monitor and placing a disk in the disk drive). Also, the Micro Math Magic program has "captured" the Reset key so that if this key is pressed, it will boot the system instead of taking you out of the program.

Breakout: If the Reset key is pressed while a Micro Math Magic program is running, the program stops before a student's score is recorded. The normal flow of information has been broken and the user is out of the program. This is a breakout. A record is kept of these breakouts so that the teacher can see who is having trouble in this regard. The breakout count will not show until the student has some other record of valid data. The correct way to leave a program is to press the ESC key. This allows the computer to finish totalling the scores and make complete records.

Byte: A unit of information consisting of eight bits. This is the smallest unit in a microcomputer system that can be addressed.

CAI: An acronym for Computer Aided Instruction.

Character: A symbol such as a letter, a digit, or a punctuation mark.

Class I.D.: A code used in the Micro Math Magic program's management system. It consists of the first four characters of a Student I.D. For example, if CS4-09 is a Student I.D., CS4- is the Class I.D. The Class I.D. identifies the class to which the student belongs. It must begin with a letter, but the next three characters may be either letters, numbers, or a dash. There can be only one Class I.D. with exactly the same characters on one disk.

Class List: Entering a list of the names of the students who will be using the Micro Math Magic program is the initial step in using the management system. When a name is entered, the management system is programmed to automatically assign a two-digit number for that name. These two characters combine with the four-character Class I.D. code to form a pupil's Student I.D. code. A list of student names entered under one Class I.D. code and their Student I.D. codes make up a Class List.

Clock: An adapter card that enables you to record the date, starting time, and elapsed time of each student's run. The Clock* keeps the elapsed time of a run even if the management system is not being used. The Clock adaptor card MUST be placed in the fourth expansion slot of your microcomputer to be used with the Micro Math Magic program. If your microcomputer does not have The Clock, the options provided by use of a clock are simply bypassed in the use of the management system.

Code: A series of characters to which the microcomputer is programmed to respond.

*The Clock is a trademark of Mountain Computer Incorporated.

Command: An instruction, usually given by typing on the keyboard, made by the user to direct the microcomputer to perform some task.

CTRL S: A command in the Micro Math Magic management system used to halt a display of information rolling down the screen. You enter this command by holding down the Control key and the key for the letter S at the same time. The display on the screen then stops moving and remains in position until you type the letter S.

Cursor: A symbol which appears at various places on the screen as an indicator of actions to be taken next, or of those just done, or of where the next character typed on the keyboard will appear. The cursor in the Micro Math Magic program is a small, blinking, white box.

Data: Information recorded by the management system during students use of the program.

Data Disk: The disk containing the information with which you want to work while using the management system. When at the Data Menu in a Micro-Math Magic program, the first request displayed in either the Print, Delete, or Save phases is for you to place the data disk in Disk Drive #1. Usually the data disk is already in the disk drive.

Delete: In the Micro Math Magic management system, this is a command which either removes the data (files) or the Class Lists (names AND data). When used to delete data, the delete command removes the old records so that you have room to store new data. When used to delete a Class List, it automatically removes the data for that class at the same time. This feature is intended to be used at the end of a school year so that the disks are clean of records in preparation for the following year.

Disk: A flat, magnetic surface on which information can be recorded and stored. The recording surface is circular, and is enclosed in a rectangular, permanent, protective covering. The entire unit is generally referred to as the disk. When a disk is inserted into the disk drive, information is recorded on the magnetic surface in a manner similar to how sounds are recorded on tape.

Disk Drive: A mechanism into which a disk is inserted; it reads information on the disk while rotating it, similar to the way a turntable plays records.

Disk Drive Light: The disk drive has a small red light which comes on when information is being passed back and forth between the microcomputer and the disk drive. Because a great amount of information travels very fast in passing, it is essential that the computer and the disk drive are not disturbed at this time. Do not type anything on the keyboard or bump the computer at this time.

"Disk Full, Get Your Teacher": See *Get your teacher.*

Display: To show information on the monitor or television screen.

DOS: An acronym for Disk Operating System, a software option incorporated into the Micro Math Magic program and other software programs enabling the microcomputer to control and communicate with the disk drive(s).

Enter: To type information to which you want the microcomputer to react.

ESC Key: Pressing the ESC (Escape) key is the correct way for a user to leave a Micro Math Magic program before completing all the problems in that

program. This may be done anytime an answer to a problem is to be entered. Leaving the program by using the ESC key enables the computer to display a student's summary for the program, and, if the management system is being used, to compile a student record.

File: Information that is going to be stored on a disk is put on the disk by the microcomputer in the form of a file. The stored records are referred to as files.

"...Get Your Teacher...": "I cannot find your I.D.! Please get your teacher. I am waiting." This message is displayed in the Micro Math Magic program when a student enters an incorrect Student I.D. twice in succession. The first time, the message displayed is "Please check your I.D. number / Reenter your Student I.D. number?" The teacher usually finds that the student has made a typing error. The teacher can press the Reset key, returning the program to the Main Menu, and the student again can begin to run the program.

The same message also is displayed when a disk is too full to hold additional student records. If further information is entered, it is not recorded. Thus the teacher needs to look at the files, print or save the information needed, and delete some files to make room for new data on the disk.

Hard Copy: Records printed on a printer; records on paper rather than displayed on a screen.

Hardware: The mechanical and electronic parts of a computer system as contrasted with the program, which is software.

I.D.: See *Identification Code.*

Identification Code: A code used in the Micro Math Magic managment system to identify a class of students using the program or to identify a student in that class.

Joy Stick: A hand control, a lever that can be connected to the microcomputer. It is used most often in playing computer games.

K: An abbreviation for the unit, kilobyte; 1,024 bytes. The number of main memory locations on a microcomputer is given as Ks. The Apple IIe has 64K as standard equipment.

Keyboard: A set of keys each representing a character. Information is transmitted to the microcomputer by typing on the keyboard.

Load: To transfer information from a disk into the microcomputer's main memory; to read information.

Loaded Class List: A Class List that has been saved on a disk and can be loaded.

Main Memory: The place where built-in information is stored in the microcomputer. This information is directly accessible to the user.

Management System: That part of the Micro Math Magic program which collects, organizes, stores, retrieves, modifies, and prints information developed as the students use the program.

Megabyte: A unit of information consisting of one million bytes.

Menu: A list of choices in a program displayed so the user may make a selection.

Menu-Driven: A program written so that it can be used by following the choices presented in various Menus. The Micro Math Magic program is Menu-driven.

Modem: A device which enables a microcomputer to receive and transmit information over a telephone line.

Monitor: The television-like picture tube used for display; a cathode ray tube (CRT) of the type used as television screens; the screen. Sometimes a color television set is used with the microcomputer instead of a monitor.

Network: Several microcomputers which are interconnected.

New Class List: A Class List that has been entered into the microcomputer but has not yet been saved on a disk.

Number Possible: The total number of problems to be worked in any of the programs on a Micro Math Magic disk; abbreviated as NP in the summary displayed after a student finishes or escapes from a program. The total number of problems in a program is shown on the Main Menu after the name of the program.

Printer: A machine which can be connected to a microcomputer and which produces paper copy of what appears on the screen when you are printing data.

Program: Instructions which tell a computer what to do to accomplish tasks; to write such instructions in a specific programming language.

RAM: An acronym for Random-Access Memory, a temporary memory that may be changed by the user.

Read: To transfer information from a disk into the microcomputer's main memory; to loan information.

Record: A line of information collected each time a student uses a Micro Math Magic program.

Reset: See *Boot.*

ROM: An acronym for Read-Only Memory, a permanent memory which cannot be changed or removed.

Run: To use a program such as Micro Math Magic.

Save: To transfer information such as records from the microcomputer to a disk.

Save Data: A choice on the Data Menu used only to save data on a disk other than the Micro Math Magic one. To do this requries a second disk drive whose adaptor card must be inserted into slot number six on your microcompter. The separate disk on which data is to be saved must be initialized (see your microcomputer owner's manual). A nine-character file name code must be entered before saving the data. This code provides specific information about the source of the data. The nine characters to be entered by the user could be three characters indicating the date, two characters which are the last two digits of the year, and two characters such as the first two letters in the name of a school. The computer then automatically adds other characters to complete the file name code.

Screen: See *Monitor.*

Software: Programs; information recorded on a disk which directs or controls the computer.

Space: The space between words or between characters is itself a character in terms of how the microcomputer reads information. If you want a

space between words or characters when you are entering information, you must enter that space by pressing the Space Bar key.

Space Bar: The long, narrow bar or key at the bottom of the keyboard. Pressing the bar produces a space between words or characters on the screen.

Spare: One of the five spare names automatically added at the end of a New Class List. A Student I.D. code is assigned to each of the spare names. Therefore, an I.D. can be given to a new student who comes into a class, and the new student can begin using the program immediately and that student's data will be recorded. The microcomputer displays "Spare" and a Student I.D. when you're printing data. You can replace "Spare" with a student's name by going to the "Change a name" choice on the Names Menu when you are working with a Loaded Class List.

Status of Disk/Computer: A choice on the Names Menu which is used to find out how much space remains on any Micro Math Magic disk for data collection.

Store: See *Save.*

Student I.D.: A code identifying each person on a Class List. This six-character code includes the four-character Class I.D. code and two numbers, which are different for each student.

Student Number: The two numbers which are the last two characters in a Student I.D. code.

Teacher's Menu: See *TMENU.*

Testing: This word along with an assigned student number of 00 is automatically included in a Class List. The word and a Student I.D. for it appear

as the first line in a display of student records. The teacher can use the Student I.D. for testing to look at a program or to demonstrate the management system without showing any actual student records.

TMENU: This is a special code to be used by teachers. It gives them access to files, information generally considered confidential. Therefore, this code is not displayed on any Menu and, thus, students do not have access to it.

"TYPE P...": The message "Type P to turn page..." is displayed when not all the program selections on the Main Menu can be displayed at once. Typing the letter P displays the remaining program selections. You can go from one to the other of the displays by typing P. You can enter your program selection from either display, even if the choice you want is on the other "page".

Use: To work at the microcomputer; to run the Micro Math Magic program.

Write: To transfer information from the microcomputer to something outside it such as a disk in the disk drive or a printer.

Write-protect: To put an adhesive sticker over the square cutout at one edge of a disk to prevent information from being written on the disk. However, information can be read from the disk.

Abbreviations

ADD = addition
AVG = averages
GT >LT = compare numbers
DEC = decimals
DIV = division
EST = estimation
FRAC = fractions
GEO = geometry
MKGCHG = making change
MKGCHT = making change tutorial
MEAS = measurement
MULT = multiplication
ODD-EV = odd and even
ORDNUM = ordering numbers
PLV = place value
RND = rounding
SUB = subtraction
CLOCK = time
WDPB = word problems